MAT 129
Lab #11
April 4, 2007

(1) Find a formula for the n-th term in the following sequence of numbers which is a first order recurrent sequence.
0, 3, 9, 21, 45, ...

(2) Find a formula for the n-th term in the following 2-nd order recurrent sequence of numbers.
0, 1, 1, 3, 5, 11, ...

(3) Suppose $A = 1, \ldots, n$ and $B = 1, \ldots, m$.
   a.) How many relations are there from A to B?
   b.) How many functions are there from A to B?
   c.) Is every relation from A to B a function from A to B? If not, give an example of a relation from A to B that is not a function from A to B.
   d.) If $n > m$, how many one-to-one functions are there from A to B?
   e.) Suppose $n \leq m$. How many one-to-one functions are there from A to B?
   f.) If $n < m$, how many functions are there from A onto B?
   g.) Notice that if $n \neq m$, then there are no bijections from A to B. Suppose $n = m$. How many bijections are there from A to B?